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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/723,540	11/27/2000	Bernd Michaelis	000432	6401

7590

11/04/2003

Law Offices of Karl Hormann  
86 Sparks Street  
Cambridge, MA 02138-2216

EXAMINER
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STREGE, JOHN B

ART UNIT	PAPER NUMBER
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2625

DATE MAILED: 11/04/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/723,540

Applicant(s)

MICHAELIS ET AL.

Examiner

John B Strege

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 November 2000.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-10 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 November 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Specification***

1. The claims in this application do not commence on a separate sheet in accordance with 37 CFR 1.52(b)(3). Appropriate correction is required in response to this action.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 5 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The terms "substantially" in claim 5 is a relative term which renders the claim indefinite. The phrase "substantially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

4. PLEASE NOTE: In rejection of claim 5, the examiner assumes that "substantially correspond" refers to the image resolution of the image forming system has the same resolution of the image which is used to derive the neural net.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Goto US Patent 5,774,230.

Claim 1 discloses “a method of defining and at least partially correcting errors of an image reproduction system.” Goto discloses a color image reproduction system that corrects the color signals of a reproduced image in order to maximize the correlation between an original and a copied image (Fig. 6) (as stated at least in the abstract and col. 1 lines 6-9).

Claim 1 further discloses that the method comprises “determining the parameters of a neuronal net by a learning process utilizing a test image of predetermined quality as a learning pattern.” Goto discloses a neural network that uses a scanned image of predetermined quality to enable the neural network to learn (S7 and S8 of Fig. 2)(as stated at least in col. 4 lines 61-65).

Claim 1 further recites “feeding data representative of an image to be reproduced to the neuronal net for processing in accordance with the parameters.” Goto discloses that the neural network receives a signal of an original image and converts it

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into a color-corrected signal in a manner to approximate the colors of the copy image to those of the original image (Fig.1) (col. 3 lines 43-49).

Finally claim 1 discloses, "operating an image forming device on the basis of the data processed by the neuronal net." Goto disclose an output device (3 Fig. 1) that reproduces the original image on the basis of the color correction device that contains the neural net discussed above (2 Fig.1).

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goto in view of Bush US Patent 6119112.

Claim 2 discloses "the method of claim 1, wherein the neuronal net is implemented in a computer." As discussed above Goto provides for the limitations of claim 1.

Goto does not explicitly state the use of a computer in order to implement the neural network, however he makes no reference to how the network is implemented so it is inherent that any of the methods that are well known in the art to implement a

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neural net could be used. It is logical to use computer with the invention of Goto in order to implement the neural network used to color correct an image since all of the inputs and outputs connecting to the device using the neural net are part of a computer system. The color-correcting device 2 (Fig. 1) that is equipped with the neural network (col. 3 line 43) is connected to a memory unit 4 (col.3 line 50), a color scanner input device 1 (col. 4 lines 61-63), and a color printer output device 3 (col.5 line 24).

Bush discloses an invention that utilizes a neural network. He explicitly states that neural networks can be implemented in any way, for example a software implementation.

Goto and Bush are analogous art because they are from the same field of endeavor of using neural networks.

At the time of the invention it would have been obvious to combine Goto and Gaborski in order to implement a neural net using a computer. The motivation for doing so would be that a large number of neural network applications are done using software so it would be a readily accessible medium, and it would allow the method to be used in a myriad of applications.

9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goto US Patent 5774230 in view of Gaborski US Patent 5052043.

Claim 3 discloses "the method of claim 1, wherein the neuronal net is implemented in an application specific circuit." As discussed above Goto provides for the limitations of claim 1.

Goto does not explicitly state the use of an application specific circuit in order to implement the neural network, however he makes no reference to how the network is implemented so it is inherent that any of the methods that are well known in the art to implement a neural net could be used.

Gaborski disclose an invention that utilizes a neural network. He explicitly states, "an entire network of neurons can be formed using a specialized digital circuit, such as an appropriate application specific integrated circuit (ASIC) (col. 18 lines 43-45).

Goto and Gaborski are analogous art because they are from the same field of endeavor of using neural networks.

At the time of the invention it would have been obvious to combine Goto and Gaborski in order to implement a neural net with an ASIC. The motivation for doing so would be to allow the invention to be utilized for hardware applications in addition to software.

10. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goto US Patent 5774230 in view of Eouzan et al US Patent 5231481 (hereinafter Eouzan). Claim 4 discloses "the method of claim 1, wherein the neuronal net is trained by data derived from an uncorrected digitized test image provided by the image forming device and wherein the target data is derived from digitized data of the original image to be reproduced." As discussed above Goto discloses all of the limitations of Claim 1. It further states "the neural network receives a RGB signal of an original image and converts the same into a color-corrected CMY signal of a copy image in such a manner

to approximate the colors of the copy image to those of the original image" (col. 3 lines 45-47).

Goto does not explicitly state that the digitized image to be reproduced is an uncorrected image derived from the image-forming device.

Eouzan discloses a method of correcting a projected image by using a camera to take an uncorrected digitized test image derived from the projector image and processing it in order to correct the image (col. 2 lines 41-46).

Goto and Eouzan are analogous art because they are from the same field of endeavor of correcting image data.

At the time of the invention it would have been obvious to someone skilled in the art to combine Goto with Eouzan by capturing an image to be corrected and feeding it to a neural net for correction. The motivation for doing so would be to create a system which corrects the coloring of an output image forming device utilizing the efficiency and accuracy of a neural network in order to better reproduce the desired color of the original image.

Claim 5 as best understood by the examiner discloses "the method of claim 1, wherein the parameters of the neuronal net are values derived from an image forming system the quality of image formation of which substantially corresponds to the image forming quality of the image forming system to be corrected." With regard to claim 5 Eouzan discloses "the use of a video camera having a resolution that is as high as the projected image" (col. 6 lines 13-15). The above rejection of Claim 5 is made based on the above 112 2<sup>nd</sup> paragraph rejection and as best understood by the examiner.



11. Claim 6 is rejected under U.S.C. 103(a) as being unpatentable over Goto in view of the publication "An Artificial Neural Network for Real-Time Image Restoration." By Krell et al (hereinafter Krell).

Claim 6 discloses "the method of claim 1, wherein the neuronal net is a mono-layered one of linear transfer function." Goto discloses the limitations of Claim 1 as discussed in the 102 rejection above.

Goto does not disclose that the neural network is a mono-layered one of linear transfer function.

Krell discloses "forming an array of restoring neurons to a single-layer neural network results in the correcting spatial filter as shown in Fig. 5a" (third paragraph of section II. The Correcting ANN).

Goto and Krell are analogous art because they are from the same field of endeavor of neural networks.

At the time of the invention it would have been obvious to combine Goto and Krell in order to make a neural network that processed faster.

Furthermore, At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use a mono-layered linear transfer function neural net. Applicant has not disclosed that using a mono-layered linear transfer function neural net provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's

invention to perform equally well with a mono-layered linear transfer function neural net because it would make the processing time faster.

Therefore it would have been obvious to one of ordinary skill in this art to modify Goto to obtain the invention as specified in claim 6.

12. Claim 8, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakano US Patent 5506696 in view of Eouzan et al US Patent 5052043 (hereinafter Eouzan).

Claim 8 discloses "An apparatus for correcting image forming data, comprising: a neuronal net implemented on a predetermined circuit and comprising parameters established by a learning process on the basis of a test image of predetermined quality." Nakano discloses an apparatus for correcting color image data in order to reproduce an image (col. 3 lines 17-20) comprising a neural network implemented on a circuit (col. 15 line 42) that uses L.a.b. signals derived from the a test image in the learning process (as can be seen in Fig. 2) (col. 9 lines 5-10).

Claim 8 further discloses, "the output of the neuronal net being connected to the inputs of an image forming device." Nakano clearly illustrates the output of the neural net being connected to various image output devices in Fig. 6. Furthermore he states that the converted color signal from the neural net is sent to the image output means to output a color image of the object to be reproduced."

Claim 8 further discloses, "a storage for image data to be reproduced and connected to the inputs of the neuronal net." In Fig. 8 Nakano discloses a memory

section 14 which is clearly connected to the inputs of the neural net, and stores data related to the image to be reproduced (col.9 lines 36-45).

Claim 8 also discloses, "an image recording device for generating digital data of an uncorrected image of a test image provided by the image forming device and connected to the inputs of the neuronal net during the learning process for defining the parameters." Nakano discloses a colorimetry device (2 Fig. 2) that generates L.a.b signals from a color image to be reproduced (col. 3 lines 45-50). Furthermore it can be seen in Fig. 2 that these signals are connected to the neuronal net and Nakano discloses learning controls means for controlling the neural network to learn from the conversion means (col. 3 lines 33-38).

Nakano does not explicitly state that the image-forming device provides the test image, although it would be justifiable to use this in order to create a type of feedback to correct an image that is displayed on a projector or similar device.

Eouzan discloses a method of correcting a projected image by using a camera to take an uncorrected digitized test image derived from the projector image and processing it in order to correct the image (col. 2 lines 41-46).

Nakano and Eouzan are analogous art because they are from the same field of endeavor of correcting image data.

At the time of the invention it would have been obvious to someone skilled in the art to combine Nakano with Eouzan by capturing an image to be corrected and feeding it to a neural net for correction. The motivation for doing so would be to create a system which corrects the coloring of an output image forming device utilizing the efficiency and

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accuracy of a neural network in order to better reproduce the desired color of the original image.

Claim 9 discloses, "The apparatus of claim 8, wherein the image recording device is connected to the inputs of the neuronal net through an image data storage."

Claim 9 is similarly rejected using the same argument as discussed above.

Claim 10 discloses, "The apparatus of claim 8, wherein the image forming quality of the image recording device is superior to the image reproducing quality of the image reproducing device."

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have the forming quality of an image recording device be superior to that of the image reproducing quality. The motivation for doing this would be to compensate for the loss of quality when making a reproduced image from an original.

### ***Allowable Subject Matter***

13. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent Number 6259824 – Image processing apparatus utilizing a neural network to improve printed image quality

US Patent Number 5748329 – Method and apparatus for adaptive color scanning/printing data correction employing neural networks

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B Strege whose telephone number is (703) 305-8679. The examiner can normally be reached Monday-Friday between 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3800.



**BHAVESH M. MEHTA**  
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